

Portable IR-Based Inspection System, PIRIS, Phase I

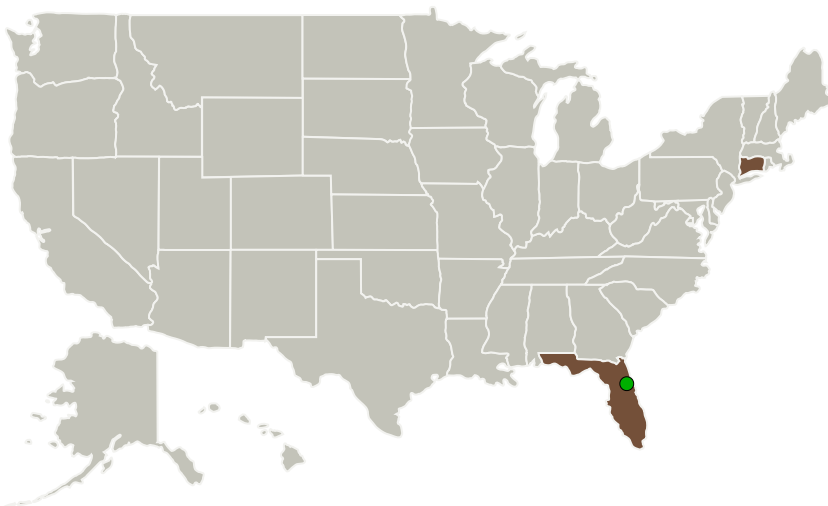
Completed Technology Project (2010 - 2010)



Project Introduction

Aerospace structures are prone to damage. In addition to cracks seen in metals, composite structures exhibit other characteristic damage modes such as, matrix cracking, delamination, fiber debonding and breakage and matrix voids. Infrared thermography methods can reveal many subsurface defects in composites including kissing disbond, which is almost impossible to identify using any other NDE method. However, no matter how complex and quantitative it may be, the information obtained through a typical NDE technique is limited to the state of damage when the inspection is performed. The growth of this damage during the service life on the other hand greatly affects the integrity of the component and may lead to catastrophic failure. In this program we will take the information provided by the NDE methods to one step further and use the IR image data obtained during regular maintenance routines to determine/predict the remaining usable life of the structure. Moreover, to facilitate practical use of the system, the ultimate goal of this project will be to provide this capability in a compact Portable IR-based Inspection System package, PIRIS. Phase I program will be based on demonstrating the feasibility of the concept through an extensive experimental program. At the end of Phase II a prototype system will be delivered to the NASA program manager. In this NASA SBIR program, MTC has partnered with Pratt&Whitney. Their hands-on involvement will provide the required technical/practical guidance to make PIRIS system a success.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Materials Technologies Corporation	Lead Organization	Industry Minority-Owned Business, Small Disadvantaged Business (SDB)	Monroe, Connecticut
● Kennedy Space Center(KSC)	Supporting Organization	NASA Center	Kennedy Space Center, Florida

Primary U.S. Work Locations

Connecticut	Florida
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Project Transitions

**January 2010:** Project Start**July 2010:** Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/139342>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Materials Technologies Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

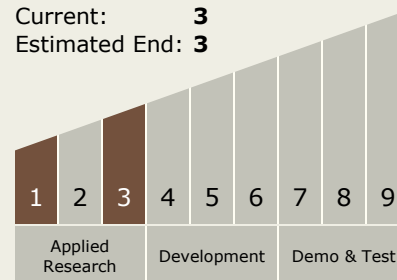
Program Manager:

Carlos Torrez

Principal Investigator:

Yogesh Mehrotra

Technology Maturity (TRL)

Start: **1**Current: **3**Estimated End: **3**

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Technology Areas

Primary:

- TX13 Ground, Test, and Surface Systems
 - └ TX13.2 Test and Qualification
 - └ TX13.2.3 Non-Destructive Inspection, Evaluation, and Root Cause Analysis

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System